Supplemental Slides

The NEW ENGLAND JOURNAL of MEDICINE

Off the Record — Avoiding the Pitfalls of Going Electronic

Pamela Hartzband, M.D., and Jerome Groopman, M.D.

Many of us remember searching frantically for a lost chart or misfiled laboratory result in the wee hours of the morning as we cared for a sick patient in the emergency ward, or requesting in vain the most recent note from a specialist about a patient who returned to our office after a consultation. The ultimate goal of the electronic medical record — a technological solution being championed by the Bush administration, the presidential candidates, and New York Mayor Michael Bloomberg, as well as Google, Microsoft, and many insurance companies — is to make all patient information immediately accessible and easily transferable and to allow its essential elements to be held by both physician and patient. The history, physical exam findings, medications, laboratory results, and all physicians' opinions will be collected in one place and available at a single keystroke. And there is no doubt that these records offer many benefits. We worry, however, that they are being touted as a panacea for nearly all the ills of modern medicine. Before blindly embracing electronic records, we should consider their current limitations and potential downsides.

As we have increasingly used electronic medical records in our hospital and received them from

The NEW ENGLAND JOURNAL of MEDICINE

Can Electronic Clinical Documentation Help Prevent Diagnostic Errors?

Gordon D. Schiff, M.D., and David W. Bates, M.D.

The United States is about to invest nearly $50 billion in health information technology (HIT) in an attempt to push the country to a tipping point with respect to the adoption of computerized records, which are expected to improve the quality and reduce the costs of care.[1] A fundamental question is how best to design electronic health records (EHRs) to enhance clinicians' workflow and the quality of care. Although clinical documentation plays a central role in EHRs and occupies a substantial proportion of physicians' time, documentation practices have largely been dictated by billing and legal requirements. Yet the primary role of documentation should be to clearly describe and communicate many questions about it persist. For example, can it be leveraged to improve quality without adversely affecting clinicians' efficiency? Will the quality of electronic notes be better than that of paper notes, or will it be degraded by the widespread use of templates and copied-and-pasted information?

A fundamental part of delivering good medical care is getting the diagnosis right. Unfortunately, diagnostic errors are common, outnumbering medication and surgical errors as causes of outpatient malpractice claims and settlements.[3] EHRs promise multiple benefits, but we believe that one key selling point is their potential for preventing, minimizing, or mitigating diagnostic errors. Admittedly, evidence to ing physicians from the patient, discouraging independent data gathering and assessment, and perpetuating errors.[4] But we envision a redesigned documentation function that anticipates new approaches to improving diagnosis, not one that relies on the putative "master diagnosticians" of past eras. The diagnostic process must be made reliable, not heroic, and electronic documentation will be key to this effort. Systems developers and clinicians will need to reconceptualize documentation workflow as part of the next generation of EHRs, and policymakers will need to lead by adopting a more rational approach than the current one, in which billing codes dictate evaluation and management and providers are forced

10 WAYS HEALTH INFORMATION TECHNOLOGY CAN HELP PREVENT AND MINIMIZE DIAGNOSTIC ERRORS

FUNCTION	EXAMPLES
Facilitate collection/gathering of information	-Quickly access past history from prior care at same and outside institutions. -Electronic collection of history of present illness, review of systems, social determinant risks, in advance of visits
Enhanced information entry, organization, and display	-Visually enhanced flowsheets showing trends, relationships to treatment -Reorganized notes to facilitate summarization, simplification, and prevent items from getting lost
Generating Differential Diagnosis	-Automated creation of lists of diagnoses to consider based on patient's symptoms, demographics, risks
Weighing diagnoses likelihoods	-Tools to assist in calculation of post-test (Bayesian) probabilities
Aids for formulating diagnostic plan, intelligent test ordering	-Entering a diagnostic consideration (e.g., celiac disease, pheochromocytoma) and computer suggests most appropriate diagnostic test(s) and how to order

10 WAYS HEALTH INFORMATION TECHNOLOGY CAN HELP PREVENT AND MINIMIZE DIAGNOSTIC ERRORS

Access to diagnostic reference information	-Info-buttons instantly linking symptom or diagnosis relevant to Harrisons, Up-to-Date chapters, references
Ensuring more reliable follow-up	-Hardwiring "closed loops" to ensure abnormal labs, missed referrals, worrisome symptoms are tracked and followed-up
Support screening for early detection	-Collaborative tools that patients, clinicians, offices, can use to know when due, order and track screening based on individualized demographics, risk factors, prior tests
Collaborative diagnosis; access to specialist	-Real time posing/answering of questions -Electronic consults; virtual co-management
Facilitating feedback on diagnoses	-Feeding back new diagnoses (from downstream providers, patients) that emerge suggesting potential misdiagnosis/errors to clinicians, ERs who saw previously

Restoring the Story
ACP Task Force

Ann Int Med 9/2020

Annals of Internal Medicine

Restoring the Story and Creating a Valuable Clinical Note

Heather E. Gantzer, MD; Brian L. Block, MD; Lacy C. Hobgood, MD; and Janice Tufte

Today's clinical notes don't serve anyone particularly well. Cogent summaries are few and far between, having been replaced by templates that emphasize billability over interpretability. These long, overly detailed documents–with dozens of imported values ranging from test results to problem lists–manage to simultaneously over- and underwhelm. On the one hand, generating and reading such a note are time-consuming tasks that require substantial cognitive load and contribute to burnout (1, 2). Yet, the final product still fails to communicate much useful information (3), and much of what it does include may not even be accurate (4).

There is a critical distinction between documentation and communication: Communication can document, but documentation alone rarely communicates what matters most. Too often, the welter of data loses the story of the patient. In particular, structured data from the electronic record are poorly suited to communicating an understanding of the actual person and their background, experiences, resources, challenges, hopes, fears, and goals. This can impede collaboration and erode humanism in medicine, especially when a patient's care involves multiple specialty teams.

We believe it is imperative that clinicians reclaim the clinical note as a means of showing the cognitive processing involved in turning medical information into a thoughtful assessment and plan. Doing so could also more effectively tell patients' stories in the context of their life circumstances and community. This reclaiming will involve 2 categories of effort: eliminating useless information, and leveraging narrative prose to communicate clinical insights and capture the patient's individuality.

Change 1: Curtailing "Note Bloat"

Current documentation practices evolved to meet billing requirements with little input from clinicians, patients, or caregivers (5). However, new Centers for Medicare & Medicaid Services documentation requirements (effective 1 January 2019) and revisions to Medicare's Physician Fee Schedule (effective 2021) will finally let clinicians focus on pertinent issues rather than a defined list of elements. There will no longer be a requirement for specific bullet points (6).

that the Centers for Medicare & Medicaid Services no longer requires doing so as a means of showing patient complexity.

Time and effort saved on data entry can be redirected to the creation of meaningful notes that relay the patient's story. Such notes would synthesize rather than summarize, concisely reflecting the cognitive work of physicians. Where raw data are needed to support decisions, artificial and augmented intelligence and machine learning will soon perform data extraction on demand, allowing clinicians to redirect effort toward higher-order cognitive tasks.

Change 2: Restoring the Story

At present, it is far too easy to open a patient chart, read volumes of data, and find that no single person has stated what they believe is happening. As a result, many clinicians find themselves writing separate sign-out documents after they have finished their official notes in order to effectively communicate to each other what actually matters. This wasted effort evinces the low regard clinicians have for the notes we are spending hours creating.

So, what should a note include? The ideal clinical note is more than a verbatim transcript. It is a coherent representation of relevant data that have been sifted through and examined in the context of the patient's life and priorities, yielding an assessment of the situation and rationale for recommended next steps. The cognitive effort of distilling complex information from multiple data sources into a cogent synthesis is the central work of internists. A medical stenographer can capture everything that happens during an encounter. A clinician, by contrast, understands what to include, what to leave out, what to act on, and how to move forward. Notes capturing this information will be far more valuable than a plain restatement of all facts.

A Way Forward: Making the Changes

The Restoring the Story Task Force of the American College of Physicians recommends the principles exemplified in the **Figure** in order to effect the changes

Clinical Documentation

CYA

Van Gogh: Self-Portrait in Front of the Easel

Canvass for Your Assessment

Canvass for Your Assessment

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OPEN ACCESS

Use of health information technology to reduce diagnostic errors

Robert El-Kareh,[1,2] Omar Hasan,[3] Gordon D Schiff[4,5]

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ABSTRACT

Background Health information technology (HIT) systems have the potential to reduce delayed, missed or incorrect diagnoses. We describe and classify the current state of diagnostic HIT and identify future research directions.

Methods A multi-pronged literature search was conducted using PubMed, Web of Science, backwards and forwards reference searches and contributions from domain experts. We included HIT systems evaluated in clinical and experimental settings as well as previous reviews, and excluded radiology computer-aided diagnosis, monitor alerts and alarms, and studies focused on disease staging and prognosis. Articles were organised within a conceptual framework of the diagnostic process and areas requiring further investigation were identified.

Results HIT approaches, tools and algorithms

INTRODUCTION

Unaided clinicians often make diagnostic errors. Vulnerable to fallible human memory, variable disease presentation, clinical processes plagued by communication lapses, and a series of well-documented 'heuristics', biases and disease-specific pitfalls, ensuring reliable and timely diagnosis represents a major challenge.[1–3] Health information technology (HIT) tools and systems have the potential to enable physicians to overcome—or at least minimise—these human limitations.

Despite substantial progress during the 1970s and 1980s in modelling and simulating the diagnostic process, the impact of these systems remains limited. A historic 1970 article[4] predicted that, by 2000, computer-aided diagnosis would have 'an entirely new role in medicine,

Box 1 Condensed set of categories describing different steps in diagnosis targeted by diagnostic health information technology (HIT) tools

- Tools that assist in information gathering
- Cognition facilitation by enhanced organisation and display of information
- Aids to generation of a differential diagnosis
- Tools and calculators to assist in weighing diagnoses
- Support for intelligent selection of diagnostic tests/ plan
- Enhanced access to diagnostic reference information and guidelines
- Tools to facilitate reliable follow-up, assessment of patient course and response
- Tools/alerts that support screening for early detection of disease in asymptomatic patients
- Tools that facilitate diagnostic collaboration, particularly with specialists
- Systems that facilitate feedback and insight into diagnostic performance

El-Kareh Schiff BMJ QS 2013

I. DIAGNOSTIC ASSESSMENT
a. Addresses chief complaint
b. Differential diagnosis related to chief complaint
c. Addresses psychosocial information/Impact
d. Discusses possible etiologies
e. Addresses degree of certainty/uncertainty
II. DIAGNOSTIC PLAN/FOLLOW-UP
a. Mentions diagnostic tests (lab, imaging)
b. Contingencies discussed in note
c. Time frames discussed in note
d. Includes rationale
III. SITUATIONAL AWARENESS/SAFETY NETS
a. Red Flags: considered/noted/commented on
b. Don't miss diagnoses considered/noted
c. Pitfalls: considered/noted/commented on
IV. DOCUMENTATION QUALITY
a. Succinctness
b. Readability (formatting, organization, clarity) 1. Readability for other clinicians 2. Patient readability (including ↑abbreviations)
c. Avoids legal liability, pejorative red flags
d. Overuse/inappropriate copy/paste, templating
V. GLOBAL SUBJECTIVE ASSESSMENT
a. Quality of diagnosis/differential diagnosis
b. Adequate testing needed for clinical situation
c. Avoids over-testing

Assessing the Assessment (ATA) for Acute Symptoms/Problems

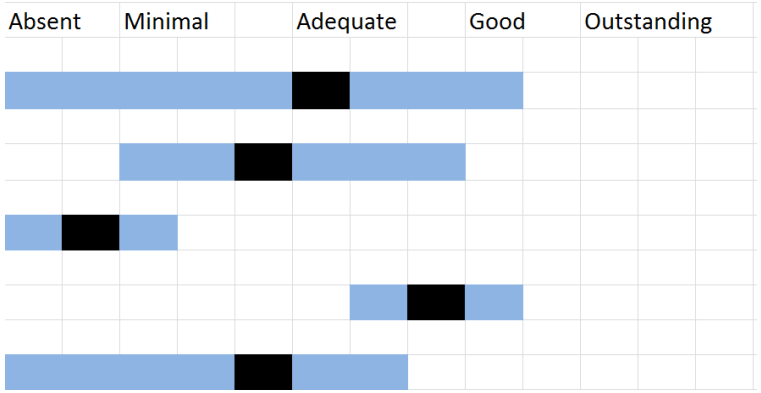
Quality of Diagnosis Documentation in Clinical Notes

1- Absent
2- Minimal/ Some mention
3- Adequate / OK
4- Good
5- Excellent / Outstanding

Assessing the Assessment (ATA)

Review 100 Urgent Care Notes

I. DIAGNOSTIC ASSESSMENT
a. Addresses chief complaint
b. Differential diagnosis related to chief complaint
c. Contextual/psychosocial information/impact
d. Discusses possible etiologies
e. Addresses degree of certainty/uncertainty



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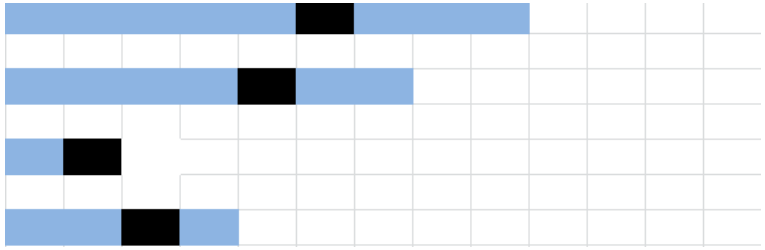

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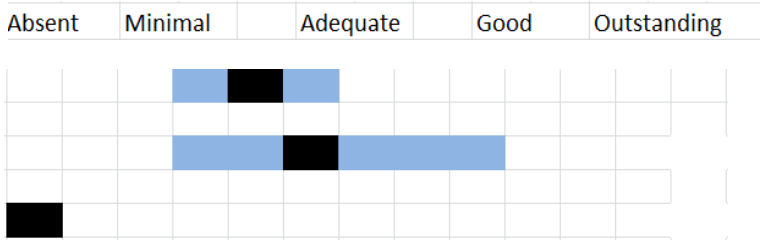

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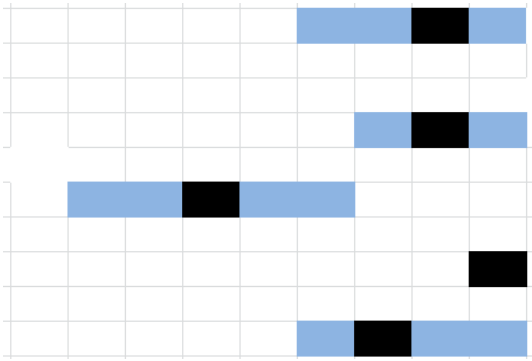

V. GLOBAL SUBJECTIVE ASSESSMENT

a. Quality of diagnosis/differential diagnosis

b. Adequate testing needed for clinical situation

c. Avoids over-testing

Guiding Principles I – Do's

Recommendations for Communicating Uncertainty

Validate Pt experience and symptoms

- Acknowledge the impact of symptoms
  - "I'm glad you brought this up/came in to the clinic"
- Elicit and acknowledge explanatory model
- Ask whether and/or why patient is worried
- Align self with patient:
  - "We are in this together"
  - "I will continue to be here for you"
  - Invite patient to be an equal partner

Guiding Principles II - Do's

Recommendations for Communicating Uncertainty

- Be transparent about uncertainty
  - "I believe that something is going on, but I do not yet know what it is."
  - "Sometimes we don't have all the answers, but we will keep trying to figure out what is going on."
  - Discuss limitations of modern medicine, testing
    - Use stories to demonstrate uncertainty
    - "Hypotheses" rather than "diagnoses"
  - Explain what about the symptoms are worrisome/not worrisome
    - Provide reassurance/concern where appropriate

Guiding Principles III - Do's

Create a concrete plan

- Plan for potential changes in symptoms
  - "Safety netting"
- Explain why time itself can be a useful test
- Provide rationale, prioritization
- Emphasize the positive, e.g. strategies to alleviate pain, % of people who do well (not poorly)
- Give choices, reach consensus when possible
- Ensure patient understanding
- Give contact information and be available
- Make clear you are open to changing your mind

Guiding Principles IV - Don’ts

- Don’t assume the patient’s concerns/worries– ASK.
- Don’t overwhelm with a laundry list of complications or possibilities
  - Avoid “nocebo” phenomenon
- Don’t diminish symptoms
  - “It’s all in your head”
- Don’t refer to specialists or testing without explaining why

Table 1
Types of clinical decision support for diagnosis

Type of CDS	Description
Order facilitators	These systems provide grouped sets of orders to streamline commonly ordered items. In addition, systems may request additional information from providers to ensure the proper order is initially selected.
Point-of-care alerts and reminders	These systems may alert providers to specific information using interruptive of passive means, depending on urgency. Examples of potential uses include prompting consideration of specific diagnostic tests, raising awareness of potential complications or interactions, and highlighting critical test results.
Relevant information display	These displays may be targeted, such as displaying renal function when ordering a contrast-enhanced imaging study. They may also include more sophisticated data aggregation and visualizations that bring together several data elements to allow clinicians to see patterns and understand the patient's current status and trajectory.
Expert systems	These systems provide complex decision support using a wide range of electronic data. Examples include differential diagnosis generators and risk and prognosis models.
Workflow support	These interventions include support, such as templates to facilitate reliable processes. Examples include support for registry functions across multiple patients and documentation aids.

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